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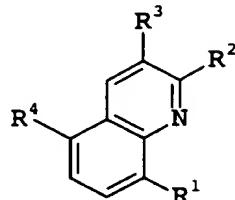
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We claim:

1. A cyclohexenonequinolinoyl derivative of the formula I

10



I

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where:

15

R¹ is hydrogen, nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxyiminomethyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl, C₁-C₆-haloalkylsulfonyl, aminosulfonyl, N-(C₁-C₆-alkyl)aminosulfonyl, N,N-di-(C₁-C₆-alkyl)aminosulfonyl, N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-haloalkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-alkylsulfonyl)amino, N-(C₁-C₆-alkyl)-N-(C₁-C₆-haloalkylsulfonyl)amino, phenoxy, heterocyclyloxy, phenylthio or heterocyclylthio, where the four last-mentioned radicals may be partially or fully halogenated and/or may carry one to three of the following substituents: nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

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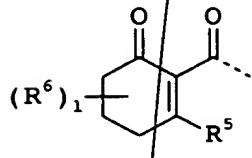
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R², R³ are hydrogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl or halogen;

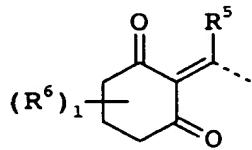
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R⁴ is a compound IIa or IIb

45



IIa



IIb

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where

R⁵ is halogen, OR⁷, SR⁷, SOR⁸, SO₂R⁸, OSO₂R⁸, POR⁸R⁹, OPR⁸R⁹, OPOR⁸R⁹, OPSR⁸R⁹, NR¹⁰R¹¹, ONR¹¹R¹², N-linked heterocyclyl or O-(N-linked heterocyclyl), where the heterocyclyl radical of the two last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:

10 nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

R⁶ is nitro, halogen, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, di-(C₁-C₆-alkoxy)methyl,

15 di-(C₁-C₆-alkylthio)methyl, (C₁-C₆-alkoxy)(C₁-C₆-alkylthio)methyl, hydroxyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy,

C₁-C₆-alkoxycarbonyloxy, C₁-C₆-alkylthio,

C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl,

20 C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl,

C₁-C₆-haloalkylsulfonyl, C₁-C₆-alkylcarbonyl,

C₁-C₆-haloalkylcarbonyl, C₁-C₆-alkoxycarbonyl or C₁-C₆-haloalkoxycarbonyl;

25 or

two radicals R⁶, which are linked to the same carbon, together form an -O-(CH₂)_m-O-, -O-(CH₂)_m-S-, -S-(CH₂)_m-S-, -O-(CH₂)_n- or -S-(CH₂)_n chain which may be substituted by one to three radicals from the following group:
halogen, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl or C₁-C₄-alkoxycarbonyl;

35 or

two radicals R⁶, which are linked to the same carbon, together form a -(CH₂)_p chain which may be interrupted by oxygen or sulfur and/or may be substituted by one to four radicals from the following group:
halogen, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl or C₁-C₄-alkoxycarbonyl;

45 or

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two radicals R⁶, which are linked to the same carbon, together form a methyldene group which may be substituted by one or two radicals from the following group:

5

halogen, hydroxyl, formyl, cyano, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-haloalkoxy, C₁-C₆-alkylthio, C₁-C₆-haloalkylthio, C₁-C₆-alkylsulfinyl, C₁-C₆-haloalkylsulfinyl, C₁-C₆-alkylsulfonyl or C₁-C₆-haloalkylsulfonyl;

10

or

two radicals R⁶, which are linked to the same carbon, together with this carbon form a carbonyl group;

15

or

two radicals R⁶, which are linked to different carbons, together form a -(CH₂)_n chain which may be substituted by one to three radicals from the following group:

20

halogen, C₁-C₆-alkyl, C₁-C₆-alkoxy, hydroxyl or C₁-C₆-alkoxycarbonyl;

25

R⁷ is C₁-C₆-alkyl, C₃-C₆-alkenyl, C₃-C₆-haloalkenyl, C₃-C₆-alkynyl, C₃-C₆-haloalkynyl, C₃-C₆-cycloalkyl, C₁-C₂₀-alkylcarbonyl, C₂-C₆-alkenylcarbonyl, C₂-C₆-alkynylcarbonyl, C₃-C₆-cycloalkylcarbonyl, C₁-C₆-alkoxycarbonyl, C₃-C₆-alkenyloxycarbonyl,

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C₃-C₆-alkynyloxycarbonyl, (C₁-C₂₀-alkylthio)carbonyl, C₁-C₆-alkylaminocarbonyl, C₃-C₆-alkenylaminocarbonyl, C₃-C₆-alkynylaminocarbonyl,

35

N,N-di-(C₁-C₆-alkyl)aminocarbonyl, N-(C₃-C₆-alkenyl)-N-(C₁-C₆-alkyl)aminocarbonyl, N-(C₃-C₆-alkynyl)-N-(C₁-C₆-alkyl)aminocarbonyl, N-(C₁-C₆-alkoxy)-

40

N-(C₁-C₆-alkyl)aminocarbonyl, N-(C₃-C₆-alkenyl)-N-(C₁-C₆-alkoxy)aminocarbonyl, N-(C₃-C₆-alkynyl)-N-(C₁-C₆-alkoxy)aminocarbonyl, di-(C₁-C₆-alkyl)-aminothiocarbonyl, C₁-C₆-alkylcarbonyl-C₁-C₆-alkyl, C₁-C₆-alkoxyimino-C₁-C₆-alkyl,

45

N-(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl or N,N-di-(C₁-C₆-alkylamino)imino-C₁-C₆-alkyl, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated

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- and/or may carry one to three of the following groups:
- cyano, C_1-C_4 -alkoxy, C_1-C_4 -alkylthio, di-(C_1-C_4 -alkyl)amino, C_1-C_4 -alkylcarbonyl, C_1-C_4 -alkoxycarbonyl, C_1-C_4 -alkoxy- C_1-C_4 -alkoxycarbonyl, di-(C_1-C_4 -alkyl)amino- C_1-C_4 -alkoxycarbonyl, hydroxycarbonyl, C_1-C_4 -alkylaminocarbonyl, di-(C_1-C_4 -alkyl)aminocarbonyl, aminocarbonyl, C_1-C_4 -alkylcarbonyloxy or C_3-C_6 -cycloalkyl;
- 10** phenyl, heterocyclyl, phenyl- C_1-C_6 -alkyl, heterocyclyl- C_1-C_6 -alkyl, phenylcarbonyl- C_1-C_6 -alkyl, heterocyclylcarbonyl- C_1-C_6 -alkyl, phenylcarbonyl, heterocyclylcarbonyl, phenoxy carbonyl, heterocycloloxy carbonyl, phenoxythiocarbonyl, heterocycloloxythiocarbonyl, phenoxy- C_1-C_6 -alkylcarbonyl, heterocycloloxy- C_1-C_6 -alkylcarbonyl, phenylaminocarbonyl, N-(C_1-C_6 -alkyl)-N-(phenyl)aminocarbonyl, heterocyclylaminocarbonyl, N-(C_1-C_6 -alkyl)-N-(heterocyclyl)aminocarbonyl, phenyl- C_2-C_6 -alkenylcarbonyl or heterocyclyl- C_2-C_6 -alkenylcarbonyl, where the phenyl and the heterocyclyl radical of the 20 last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:
- 20** nitro, cyano, C_1-C_4 -alkyl, C_1-C_4 -halogenalkyl, C_1-C_4 -alkoxy or C_1-C_4 -haloalkoxy;
- 25** R^8, R^9 are C_1-C_6 -alkyl, C_3-C_6 -alkenyl, C_3-C_6 -haloalkenyl, C_3-C_6 -alkynyl, C_3-C_6 -haloalkynyl, C_3-C_6 -cycloalkyl, hydroxyl, C_1-C_6 -alkoxy, amino, C_1-C_6 -alkylamino, C_1-C_6 -haloalkylamino, di-(C_1-C_6 -alkyl)amino or di-(C_1-C_6 -haloalkyl)amino, where the abovementioned alkyl, cycloalkyl and alkoxy radicals may be partially or fully halogenated and/or may carry one to three of the following groups:
- 30** cyano, C_1-C_4 -alkoxy, C_1-C_4 -alkylthio, di-(C_1-C_4 -alkyl)amino, C_1-C_4 -alkylcarbonyl, C_1-C_4 -alkoxycarbonyl, C_1-C_4 -alkoxy- C_1-C_4 -alkoxycarbonyl, di-(C_1-C_4 -alkyl)amino- C_1-C_4 -alkoxycarbonyl,
- 35**
- 40**
- 45**

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hydroxycarbonyl, C_1-C_4 -alkylaminocarbonyl,
 $di-(C_1-C_4\text{-alkyl})$ aminocarbonyl, aminocarbonyl,
 C_1-C_4 -alkylcarbonyloxy or C_3-C_6 -cycloalkyl;

10

phenyl, heterocyclyl, phenyl- C_1-C_6 -alkyl,
heterocyclyl- C_1-C_6 -alkyl, phenoxy, heterocyclyoxy,
where the phenyl and the heterocyclyl radical of
the last-mentioned substituents may be partially
or fully halogenated and/or may carry one to three
of the following radicals:
nitro, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl,
 C_1-C_4 -alkoxy or C_1-C_4 -haloalkoxy;

15

R^{10} is C_1-C_6 -alkyl, C_3-C_6 -alkenyl, C_3-C_6 -haloalkenyl,
 C_3-C_6 -alkynyl, C_3-C_6 -haloalkynyl, C_3-C_6 -cycloalkyl,
hydroxyl, C_1-C_6 -alkoxy, C_3-C_6 -alkenyloxy,
 C_3-C_6 -alkynyoxy, amino, C_1-C_6 -alkylamino,
 $di-(C_1-C_6\text{-alkyl})$ amino or C_1-C_6 -alkylcarbonylamino,

20

where the abovementioned alkyl, cycloalkyl and
alkoxy radicals may be partially or fully
halogenated and/or may carry one to three radicals
from the following group:

25

cyano, C_1-C_4 -alkoxy, C_1-C_4 -alkylthio,
 $di-(C_1-C_4\text{-alkyl})$ amino, C_1-C_4 -alkylcarbonyl,
 C_1-C_4 -alkoxycarbonyl,
 C_1-C_4 -alkoxy- C_1-C_4 -alkoxycarbonyl,
 $di-(C_1-C_4\text{-alkyl})$ amino- C_1-C_4 -alkoxycarbonyl,
hydroxycarbonyl, C_1-C_4 -alkylaminocarbonyl,
 $di-(C_1-C_4\text{-alkyl})$ aminocarbonyl, aminocarbonyl,
 C_1-C_4 -alkylcarbonyloxy or C_3-C_6 -cycloalkyl;

30

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phenyl, heterocyclyl, phenyl- C_1-C_6 -alkyl or
heterocyclyl- C_1-C_6 -alkyl, where the phenyl or
heterocyclyl radical of the four last-mentioned
substituents may be partially or fully halogenated
and/or may carry one to three of the following
radicals:

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R^{11} , R^{12} are C_1-C_6 -alkyl, C_3-C_6 -alkenyl, C_3-C_6 -alkynyl or
 C_1-C_6 -alkylcarbonyl;

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1 is 0 to 6;
m is 2 to 4;

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n is 1 to 5;

p is 2 to 5;

5 and their agriculturally useful salts.

2. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1, where

10 R¹ is halogen, C₁-C₆-alkyl, C₁-C₆-haloalkyl, C₁-C₆-alkoxy, C₁-C₆-alkylthio, heterocyclyloxy or phenylthio, where the two last-mentioned radicals may be partially or fully halogenated and/or may carry one to three of the substituents mentioned below:

15 nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

20 R⁵ is halogen, OR⁷, SR⁷, SOR⁸, OSO₂R⁸, OPR⁸R⁹, OPOR⁸R⁹, OPSR⁸R⁹, NR¹⁰R¹¹ or N-bonded heterocyclyl which may be partially or fully halogenated and/or may carry one to three of the following radicals:
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.

25 3. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claim 1 or 2, where

30 R⁵ is halogen, OR⁷, NR¹⁰R¹¹ or N-bonded heterocyclyl which may be partially or fully halogenated and/or may carry one to three of the following radicals:
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy.

35 4. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claims 1 to 3, where

40 R⁷ is C₁-C₆-alkyl, C₁-C₂₀-alkylcarbonyl, C₁-C₆-alkoxycarbonyl, (C₁-C₂₀-alkylthio)carbonyl, N,N-di-(C₁-C₆-alkyl)aminocarbonyl, phenyl, phenylcarbonyl or phenoxy-C₁-C₆-alkylcarbonyl, where the phenyl radical of the three last-mentioned substituents may be partially or fully halogenated and/or may carry one to three of the following radicals:
nitro, cyano, C₁-C₄-alkyl, C₁-C₄-haloalkyl, C₁-C₄-alkoxy or C₁-C₄-haloalkoxy;

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R^{10} is C_1-C_6 -alkyl or C_1-C_6 -alkoxy;

R^{11} is C_1-C_6 -alkyl.

- 5 5. A cyclohexenonequinolinoyl derivative of the formula I as claimed in claims 1 to 4, where

R^6 is nitro, halogen, cyano, C_1-C_6 -alkyl, C_1-C_6 -haloalkyl, di-(C_1-C_6 -alkoxy)methyl, di-(C_1-C_6 -alkylthio)methyl,
 10 (C_1-C_6 -alkoxy)(C_1-C_6 -alkylthio)-methyl, hydroxyl, C_1-C_6 -alkoxy, C_1-C_6 -haloalkoxy, C_1-C_6 -alkoxycarbonyloxy, C_1-C_6 -alkylthio, C_1-C_6 -haloalkylthio, C_1-C_6 -alkylsulfinyl, C_1-C_6 -haloalkylsulfinyl, C_1-C_6 -alkylsulfonyl, C_1-C_6 -haloalkylsulfonyl, C_1-C_6 -alkylcarbonyl, C_1-C_6 -haloalkylcarbonyl, C_1-C_6 -alkoxycarbonyl or C_1-C_6 -haloalkoxycarbonyl;

or

20 two radicals R^6 , which are linked to the same carbon, together form an $-O-(CH_2)_m-O-$, $-O-(CH_2)_m-S-$, $-S-(CH_2)_m-S-$, $-O-(CH_2)_n-$ or $-S-(CH_2)_n$ chain which may be substituted by one to three radicals from the following group:
 25 halogen, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl or C_1-C_4 -alkoxycarbonyl;

or

30 two radicals R^6 , which are linked to the same carbon, together form a $-(CH_2)_p$ chain which may be interrupted by oxygen or sulfur and/or may be substituted by one to four radicals from the following group:

35 halogen, cyano, C_1-C_4 -alkyl, C_1-C_4 -haloalkyl or C_1-C_4 -alkoxycarbonyl;

or

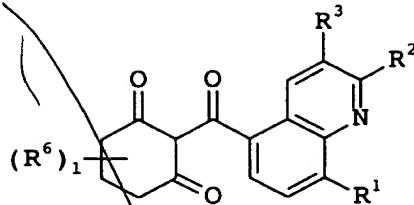
40 two radicals R^6 , which are linked to the same carbon, together with this carbon form a carbonyl group.

6. A process for preparing compounds of the formula I as claimed in claims 1 to 5 where R^5 = halogen, which comprises reacting
 45 a cyclohexanedione derivative of the formula III,

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III

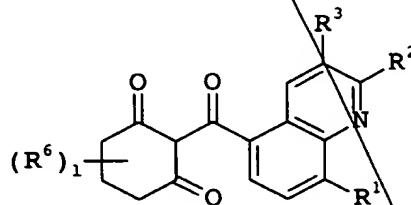
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where the variables R¹ to R³, R⁶ and l are each as defined in claims 1 to 5, with a halogenating agent.

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7. A process for preparing compounds of the formula I as claimed in claims 1 to 5 where R⁵ = OR⁷, OSO₂R⁸, OPR⁸R⁹, OPOR⁸R⁹ or OPSR⁸R⁹, which comprises reacting a cyclohexanedione derivative of the formula III,

20

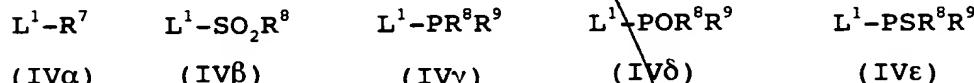


III

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where the variables R¹ to R³, R⁶ and l are each as defined in claims 1 to 5, with a compound of the formula IV α , IV β , IV γ , IV δ or IV ϵ ,

30



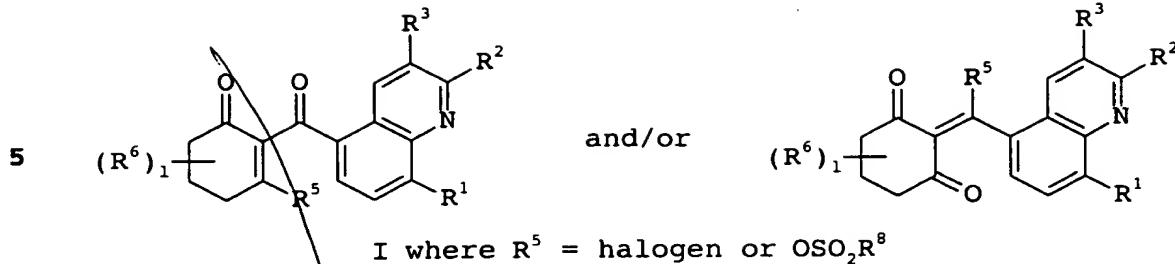
where the variables R⁷ to R⁹ are each as defined in claims 1 to 5 and L¹ is a nucleophilically replaceable leaving group.

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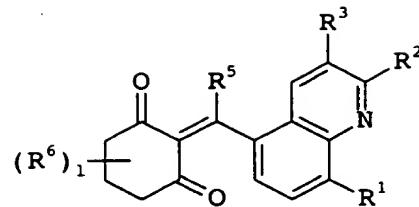
8. A process for preparing compounds of the formula I as claimed in claims 1 to 5 where R⁵ = OR⁷, SR⁷, POR⁸R⁹, NR¹⁰R¹¹, ONR¹¹R¹², N-linked heterocyclyl or O-(N-linked heterocyclyl), which comprises reacting a compound of the formula Ia (= I where R⁵ = halogen, OSO₂R⁸),

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45



and/or



10 where the variables R^1 to R^3 , R^6 and l are each as defined in claims 1 to 5, with a compound of the formula $V\alpha$, $V\beta$, $V\gamma$, $V\delta$, $V\epsilon$, $V\eta$ or $V\theta$,

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A'

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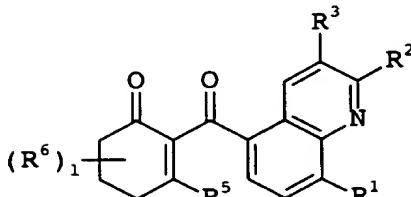
HOR^7	HSR^7	$HPOR^8R^9$	$HNR^{10}R^{11}$	$HONR^{11}R^{12}$
($V\alpha$)	($V\beta$)	($V\gamma$)	($V\delta$)	($V\epsilon$)
$H(N\text{-linked heterocyclyl})$			$H(ON\text{-linked heterocyclyl})$	
($V\eta$)			($V\theta$)	

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where the variables R^7 to R^{12} are each as defined in claims 1 to 5, if appropriate in the presence of a base.

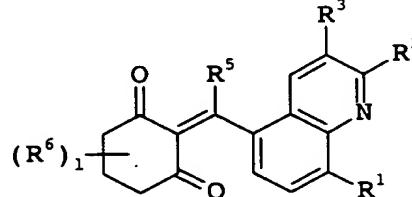
25 9. A process for preparing compounds of the formula I as claimed in claims 1, 2 or 5, where $R^5 = SOR^8$, SO_2R^8 , which comprises reacting a compound of the formula $I\beta$ ($= I$ where $R^5 = SR^8$),

30



and/or

35

I where $R^5 = SR^8$ 

40

where the variables R^1 to R^8 and l are each as defined in claims 1, 2 or 5, with an oxidizing agent.

45

10. A composition, comprising a herbicidally effective amount of at least one cyclohexenonequinolinoyl derivative of the formula I or an agriculturally useful salt of I as claimed in claims 1 to 5 and auxiliaries which are customarily used for formulating crop protection agents.

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- 5 11. A process for preparing compositions as claimed in claim 10,
which comprises mixing a herbicidally effective amount of at
least one cyclohexenonequinolinoyl derivative of the formula
I or an agriculturally useful salt of I as claimed in claims
1 to 5 and auxiliaries which are customarily used for
formulating crop protection agents.
- 10 12. A method for controlling undesirable vegetation, which
comprises allowing a herbicidally effective amount of at
least one cyclohexenonequinolinoyl derivative of the formula
I or an agriculturally useful salt of I as claimed in claims
1 to 5 to act on plants, their habitat and/or on seeds.
- 15 13. The use of cyclohexenonequinolinoyl derivatives of the
formula I or their agriculturally useful salts as claimed in
claims 1 to 5 as herbicides.

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